

Ultra-Lightweight Nanocomposite Foams and Sandwich Structures for Space Structures Applications, Phase I

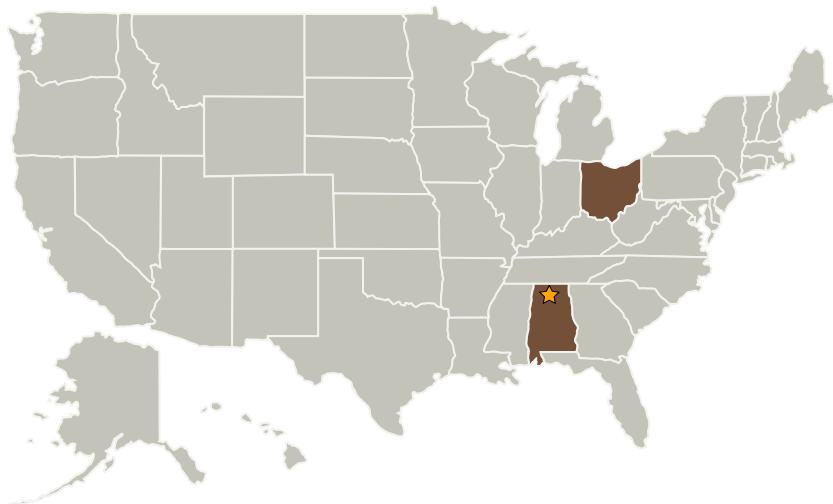
Completed Technology Project (2007 - 2007)



Project Introduction

Space structures that are ultra-lightweight, and have gas barrier property, space durability, radiation resistance and high impact resistance are desirable to improve the reliability and provide a safe resting environment for astronauts and equipment operation. Some of the components currently in use such as stations or habitats use double-wall thick films with high internal pressure. Some components are in thin film form and the specific rigidity and dimensional stability needs improvement. Components of landers and vehicles are subject to dust impact. All these solid or hollow components are vulnerable in space because of the foreign object impact or radiation attack. In this Phase I project, we propose to develop ultra-lightweight, microcellular nanocomposite foams and sandwich structures that possess all the desirable properties mentioned above. The structural module can be compacted into a small volume to facilitate launching. The proposed microcellular nanocomposite foam and sandwich structures do not involve or release any toxicity and will have much higher specific mechanical properties than foams and sandwich structures processed by the conventional techniques. They can be used to either replace or supplement to the inflatable technology for improvement in reliability, durability, and safety in space operation. Preliminary research results are very encouraging.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center
(MSFC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Wright Materials Research Co.	Supporting Organization	Industry	Beavercreek, Ohio

Primary U.S. Work Locations

Alabama	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.1 Lightweight Structural Materials